A

Plea For Cold Climates.

IN THE TREATMENT OF

PULMONARY CONSUMPTION.

MINNESOTA AS A HEALTH RESORT.

BY

TALBOT JONES, M. D.,

OF ST. PAUL, MINN.

(*Reprinted from the New York Medical Journal, Sept.* 1879.)

NEW YORK:

1879.

A

Plea For Cold Climates.

IN THE TREATMENT OF

PULMONARY CONSUMPTION.

MINNESOTA AS A HEALTH RESORT.

BY

TALBOT JONES, M. D.,

OF ST. PAUL, MINN.

(*Reprinted from the New York Medical Journal, Sept.* 1879.)

NEW YORK:

1879.

A PLEA FOR COLD CLIMATES IN THE TREATMENT OF PULMONARY CONSUMPTION. MINNESOTA AS A HEALTH RESORT.

THERE is perhaps no subject which has received a larger share of attention from the medical profession, scientists, and sanitarians, or concerning which more has been written, than the one of climatology, with special reference to its effects upon consumption. The importance of the subject, even now but too little appreciated by the medical profession, is deserving of all the diligent research and intelligent investigation which has been bestowed upon it. Indeed, it is scarcely an exaggeration to say that a more important subject never enlisted the attention of scientific men, for, of all the diseases which affect mankind, tuberculous consumption is the most important, and, excluding epidemics, causes the greatest proportion of deaths.

The Registrar-general of England and Wales gives about twelve out of every hundred deaths to consumption, as the mean rate through a series of years.

Dr. Schnepp's ("Archives de Medecine," 1865) statistics show that of the population of England, Russia, Germany, and France, aggregating 230,000,000, the annual deaths from this disease are 869,000. Of the people inhabiting the globe, numbering 968,000,000, 3,000,000 each year die of this disease. But it is not necessary to go very deep in statistics to prove that consumption is a fearfully prevalent disease ; there can be no dif-

ference of opinion on that point. Accepting this then, as true, it will be the labor of this paper to show that, of all the resources at our command in warding off this malady where a predisposition to it exists, or in combating it when once established, dependence alone can be placed on climate. But, before proceeding to speak of climates in general, or that best adapted to each individual case, it will perhaps be not unprofitable to briefly allude to the anatomical change which takes place in the lung-tissue of those laboring under phthisis. Formerly the doctrine of Laennec's, that "phthisis always depended upon tubercle," was accepted as a fact by the profession at large, and, under the influence of his great name, finally became a dogma, which continued to obtain support and belief, leading naturally to the second error, following almost as a corollary to the first, "that phthisis and tuberculosis were identical."

This neoplasm, or tubercle, was supposed to be developed in the lung-tissue, and undergo numerous but obscure changes. Others maintain that all the varied phenomena which take place in the lung-tissue may be explained under the one process—inflammation. Niemeyer has made the announcement that oftentimes in the lungs of those dead of consumption not a single tubercle is to be found. This writer declares that many of the lesions which are generally attributed to tubercle, and which the followers of Laennec and Louis still consider due to this agency, are really consequences of a chronic pneumonia, the primary changes having their seat in the bronchi and the cavities of the alveoli, and the process characterized by an enormous proliferation of cell elemente. This variety is chiefly epithelial or cellular, and may be called catarrhal phthisis.

Virchow substantially agrees with Niemeyer. "The latter divides pulmonary consumption into two groups, one depending upon miliary tubercle, the other the result of chronic pneumonia. It is not only a certain kind of pneumonia which may cause phthisis, but every simple inflammation of the lungs may result in it. While it is chronic catarrhal pneumonia which most frequently leads to caseous deposit and consequent ulceration of the lungs (and this is the most frequent form of consumption), the acute catarrhal and croupous forms also frequently end in phthisis.

The phthisis resulting from miliary tuberculosis is, therefore, according to Niemeyer, the only form not depending upon inflammation for "its origin." Ordinary bronchial catarrh often gives rise to the yellow tuberculous deposit. There is still another variety of consumption in which there is a proliferation of connective-tissue elements, occurring primarily in the alveoli and bronchial connective-tissue, which may be termed fibrous phthisis. Here normal lung-substance is replaced by this areolar tissue, and is analogous to the morbid process seen in the inter-lobular spaces of those dead of cirrhosis of the liver, or of those who have locomotar ataxia or sclerosis of the brain—all of these mordid conditions being due to one and the same agency, to wit, connective-tissue hyperplasia. "The processes of inflammation, as we now study them, are so numerous and varied that they include all the changes that are found in the lungs of those who die of any form of phthisis. While one class of these changes may be produced by inflammatory changes in the cell elements of the lung tissue, another class may be due to an inflammation which may result in the production of serum, fibrin, and pus. Necrotic and reparative inflammatory processes may give rise to another set of changes in the lungs, and a hyperlastic or tubercular inflammation may cause the development of those nodular masses concerning which recently there has been so much discussion." (Professor Loomis's address before the American Medical Association, 1878.) When we come to examine into the comparative merits of climate with reference to the influence it exerts for good, or as a curative agent, we are at the outset almost bewildered at the diversity of opinion which is entertained as to just what constitutes a good climate.

The great importance of climatic treatment in appropriate cases of consumption has been recognized and insisted upon since medicine had its birth as a science. Hippocrates had very clear ideas as to the efficacy of climate in the disorder.

Aretæus recommended long sea-voyages, just as Bennet does to-day; while Celsus spoke of the benefit to be derived from camping in the pine forests, as does Professor Loomis now. However widely the profession may differ concerning the etiology and morbid anatomy of consumption, there is a singular unanimity of opinion among authorities that, in order to arrest the

progress of the disease already commenced, or diminish to a minimum the probability of its development in those threatened, most reliance must be placed in the climatic treatment. The acrimonious contests which have been waged among pathologists for more than half a hundred years, with regard to the pathological changes which take place in the lungs of phthisical subjects, have not correspondingly obscured the advantages likely to result to the invalid by a change of situation ; but, having concentrated attention upon the whole subject, it has rather been the means of uniting all schools in a common belief that in climate alone can reliance be placed as a curative agent. Upon this common ground, then, the disciples of Laennec and Louis, on the one hand, and those of Virchow, Niemeyer, and Waldenburg, on the other, can and do stand to-day, each maintaining that where phthisis has not reached the so-called second stage, or stage of ulceration and excavation, a change of climate, intelligently made, together with the proper adjuvants, will cure the disease definitely in an indefinite number of cases. "Of all the means hitherto recommended for the cure of phthisis, none have been followed more frequently by complete cessation of the disease than change of situation" [Laennec on the Chest]. "The most important means in the treatment of phthisis, indeed the sovereign remedy, as compared with all others, is climate. If it is taken advantage of early enough, and not, as unhappily is too often the case, when it is already too late, we may expect the best results from it. I have often observed, and every physician as well as myself must have observed, the most cures of chronic phthisis from climatic influence; it is true many are but temporarily benefited, but sometimes there are perfect cures." [Waldenburg]. These two quotations from eminent authorities, representing different schools of thought, will suffice to show the high estimation which is placed upon climate as a therapeutic agent. Quotations to the same effect from authors equally learned and distinguished could be multiplied, but the same truth would be only elaborated thereby.

When we remember how lamentably therapeutics has failed us in this disease, it is no surprise that the profession should at last come to place most reliance on climatic treatment. Remedies almost without number have from time to time been pre-

sented, and greatly lauded, only to be abandoned "after being tested by that great regulator—clinical experience." That we possess no remedy acting as a specific in this disease was never more apparent to the medical profession than it is to-day. All honorable practitioners must admit this. The remedies possessing real, decided value can be counted upon the fingers of one hand. When, therefore, we see how little dependence there is to be placed on mere therapeutic agents in combating consumption, and when it has been shown how much real benefit not unfrequently follows climatic treatment, the importance of insisting upon a change of situation when it can be made, and of making no mistake in the selection of the proper climate, is a vital matter. One had much better make no change at all than to select a climate at hap-hazard, and without reference to just the climate which his particular case demands. Therefore, while authorities are agreed with regard to the advisability, nay, the necessity, of a change of climate in order to the successful treatment of phthisis, there is great difference of opinion as to just what constitutes a climate from which the best results will be secured. Some recommend a visit to mountainous resorts, others long sea voyages, many warm, moist climates, while not a few insist upon cold and dry climates as meeting all the indications in the treatment of consumption. When we begin to inquire into the character and comparative merits of climates, we are at once struck with the fallacy of the doctrine, which has obtained for generations, that the disease is more frequent in cold than in warm latitudes. Just the reverse of this is true. From an extensive series of data, it has lately been shown that the further we progress north the greater immunity the inhabitants enjoy from consumption. It is well known that "far up in the north, where the Ice King is," consumption is either extremely rare or altogether unknown. In the bleakest, coldest, and most exposed portions of the globe, where winter exists well-nigh continuously, and where sudden and severe changes of the atmosphere hold to a maximum, consumption is very infrequent. Indeed, so true is this that we are forced to the conclusion that extreme cold is inimical to the production of consumption.

Professor Flint quotes Dr. Hjaltelin, who resides in Iceland,

as declaring that phthisis is unknown on that island. Finmark, northern Greenland, north Sweden and Norway are likewise almost exempt from a disease which carries off one-tenth of the population of the tropics. The mortuary reports of St. Petersburg and Moscow, Russia, show a mortality from phthisis much less than that of either Constantinople or Rome, both of which places are favorite sanitaria for pulmonary invalids. Stockholm, in a cold climate, although never spoken of as a health resort, shows an annual death-rate from consumption only half as great as that of either Venice, Florence, or Pisa, which are in a warm climate, and which have been heretofore greatly lauded as health resorts. Thorowgood, in his work on the "Climatic Treatment of Consumption," says that the mortality from consumption in London is 277 in 100,000; while in Norway it is but 100 in 100,000. Northern Scotland shows fewer deaths from this disease than southern England, and London mortuary reports compare very favorably with those of Edinburgh.

"The inhabitants of cold climates are not particularly liable to be affected by the external forms of tuberculous disease" (Mr. Phillips on Scrofula). Colonel Tulloch, in his report to the British War Offices, shows that the soldiers sent to cold and dry countries are less frequently affected by scrofula than those stationed in hot countries. In Nova Scotia and New Brunswick, where the winter temperature is very low, the disease is less frequent than in Jamaica and at Sierra Leone (see Fisk Fund Prize Essay). The mortality of Montreal, Canada, to-day is less than that of Havana; and that of St. Paul less than that of Jacksonville, Fla. Quebec is much less scourged by disease than is New Orleans, Mobile, or Galveston. Dr. Forry, who has written exhaustively on the subject of consumption as it affects the American army, is authority for the statement that the proportion of soldiers annually attacked by consumption amounts to 10$\frac{3}{4}$ per 1,000 in the entire country, while in the northern regions, where the climate is most severe, the proportion of phthisical patients is not more than 5 yer 1,000.

Dr. Bennet ["On the treatment of Pulmonary Consumption by Hygiene, Climate, and Medicine," London, 1866], although advocating a warm climate as the one best adapted to the needs of consumptives, admits that the statistics of the French army

clearly indicate that soldiers suffering from phthisis get much worse in warm climates; and a reviewer of this work, in the "American Journal of the Medical Sciences," October, 1868, says, "it is well known that the extreme heat of our own [American] summers proves extremely fatal to those in the third stage of phthisis." Brompton Hospital in England is devoted exclusively to the treatment of consumption. To test the value of a warm climate in the treatment of this disease upon a large number of patients, the authorities of that institution, in 1865, sent twenty-six well-marked cases to winter in Madeira, which is one of the most popular and celebrated sanitaria. The report published on the return of these patients showed that two out of the twenty-six returned improved; seven were slightly improved; twelve were no better and no worse; five were made worse, and one died [Thorowgood].

"Fifteen years ago the belief prevailed that the essential climatic element for the arrest and cure of phthisis was a warm, dry atmosphere. More recent observations and investigations have settled the fact that phthisis is not necessarily hastened in its development by a low [cold] temperature, and is not prevented or cured by a higher temperature" [Loomis before the American Medical Association, 1878]. While, therefore, the immunity which cold countries enjoy from phthisis is clearly indicated, attested alike by a large series of data and a vast clinical experience, observation equally exact, and from authority fully as high, tends to establish the truth that the favorite habitat of consumption is included within the isothermal lines of 30° and 40° mean annual temperature. While no zone is absolutely free from the disease, it is the temperate and torrid ones where the death rate holds to a maximum. In the climatic treatment of phthisis it has heretofore been the custom, and, it must be acknowledged, is still only too frequently the habit, to send patients applying to us for advice indiscriminately to Nassau, Havana, Jacksonville, or New Orleans; without the slightest regard to the needs and requirements of each individual case. It was only necessary to detect weak lungs, or suspect the early development of consumption, or discover crude tubercle, before we gave the stereotyped and peremptory order to leave at once for Cuba, Florida, or San Antonio in Texas. It has been shown

by Fuller that on the coasts of Spain, Italy, and France, bordering on the Mediterranean Sea, and in Madeira and Malta, which together constitute the most popular sanitaria in Europe for consumptives, the ratio of mortality to the natives from this disease exceeds that of England. The well-known high mortality from the disease in England, taken in connection with the fact that these favorite southern health resorts exhibit even a greater ratio of deaths, indicates very clearly that the popular belief that Southern Europe, and especially Italy and the coasts of France, is almost exempt from consumption is untrue, and therefore mischievous. If there is anything, with reference to climate, which is definitely settled, it is the fact that phthisis is vastly more common in warm, tropical countries than in cold latitudes. Consumption is relatively as common in our own southern health resorts as it is in the corresponding warm countriec in Europe. Florida, which has been so vaunted as a sanitarium for invalids, shows a greater ratio of mortality from phthisis to-day than Minnesota. Dr. Pollock [London "Lancet"] says, "in the West India Islands the disease is met with in its most severe and rapid forms."

"A French writer in the 'Gazette Medicale' states that at Rio de Janeiro the number of consumptive patients in the hospital is nearly as great as in Paris. The Professor of Medicine in that city considered that a sixth part of the mortality among the poorer classes in Brazil was owing to this cause" [Lee]. The rational and legitimate deductions to be drawn from the foregoing facts are that cold climates are inimical to the development of consumption, while the mortality the world over holds to a maximum in warm latitudes. The question now arises, if all this be true, why is it that medical men, both in this country and in Europe, have, up to within the last ten or fifteen years, almost invariably advised their patients to seek warm countries as a means of relief to their pulmonary troubles?

When we consider the high rate of mortality in humid southern climates, not only to patients sojourning there in quest of health, but to the natives who have always resided there; and, on the other hand, when we know the favorable results which, as a rule, attend the sending of patients to cold latitudes, as well as the low rate of mortality to the natives from con-

sumption in these locations, the question is a difficult one to answer. Although practically not so important, the question why warm climates should exhibit such a large death rate from phthisis is still an interesting one Take for example Cuba, or, indeed, any of the West India Islands or Florida. The latter is perhaps to-day more frequented by pulmonary invalids than any of our southern places of resort. The exceeding fatality of consumption to families who for generations have resided in that State, as well as the unfavorable effects, as a rule, observed upon patients who visit that State in declining health, is well known. We are not surprised that such is the case after having carefully analyzed the climate, for really there is little that can be said in its favor, and a great deal which must be said against it. "Two causes predominate over all others—deficiency of muscular exercise and humidity give rise to most chronic disorders. These causes act principally upon the skin ; they tend incessantly to repel within the torrent of the circulation superfluous or excrementitious elements which should be eliminated from the economy; they produce alterations of the blood and cachectic states of the system, of which the origin is unknown" [Edwards]. The effects of a hot and humid atmosphere upon the skin is either to entirely suppress cutaneous transpiration, or reduce it to a minimum. We have the highest authority for the statement that the suppression of this insensible perspiration, from whatever cause, is not only immediately harmful and dangerous, but is very likely to even rise to the tuberculous cachexy. The importance of the skin as a supplementary organ to the lungs, in ridding the economy of effete matters, is universally acknowledged. "In hot and damp weather the cutaneous perspiration is performee with difficulty, a feeling of languor and depression, which makes the heat appear stifling and renders all exertion insupportable" [Foissac, "De la Meteorologie"]. This indisposition to exertion, either physical or mental, due in part to humidity, suppression of the insensible perspiration, and to heat, is a serious drawback to a patient's improvement. A certain amount of exercise in the open air is the *sine qua non* to the successful treatment of a patient with phthisis. Florida would be unfit for a patient to visit, for this reason if for no other. Here everything invites to repose, an irresistible

feeling of langnor seizes a person, one's energies are paralyzed, and exercise consequently neglected. "There is a sensation of fullness in the head, and it has the effect of diminishing the nervous energies, and of inducing nervous congestion of the internal organs." As a natural result of this lack of muscular exertion and neglect of exercise, there follows great relaxation of both the nervous and muscular systems—effects so disastrous that even the warmth of climate and change of scene, with the fresh hope these inspire, can not counterpoise them. The ideal climate is still undiscovered ; and, while we must admit this, it does not lessen the value of certain features of climate which have been discovered and shown to possess decided advantage in the treatment of consumption. Out of a vast accumulation of facts with regard to climate, from exhaustive analysis of the influence on phthisis of humidity, altitude, temperature, soil, ozone, direction and velocity of the wind, elevation above the sea, voyages upon the sea, atmospheric pressure, etc., there are some facts upon which the profession are agreed. Altitude will first be noticed. Careful investigation of this matter made by competent and trustworthy men, both in this country and in Europe, clearly indicates the importance of altitude in the climatic treatment of consumption.

Fuchs, from a large series of data, shows that the greatest mortality in Europe from this disease is in those cities and towns situated upon the sea-coast. The same truth obtains among countries as well as cities which have but small elevation above the sea. This, by most writers, is supposed to stand in a causative relation to the high rate of mortality observed in England, the lowlands of Holland, and that portion of Germany bordering on the sea. Mortuary reports of the cities of this country, situated upon the sea-coast, in whatever latitude, show a maximum death rate from consumption. This high mortality decreases with elevation up to a certain point, depending upon latitude—the nearer we approach the equator the greater must be the altitude. The following quotation from Thorogood will suffice to show the influence which altitude exerts. "At Marseilles, on the seaboard, the mortality from consumption is 25 per cent.; Hamburg, 48 feet above the sea, 23 per cent.; while at Eschvege, 496 feet, it is only 12 per cent., and at Brotterode,

1,800 feet above the sea, it is but 0·9 per cent." When the favorable influence which altitude exerted upon consumption became apparent to the profession, for a time sea voyages were nearly abandoned, and hitherto favorite resorts near the sea-coast deserted. The tide turned toward the mountains. Invalids who had heretofore relied on the favorable effects of long sea voyages, now placed all their hopes in resorts from 2,500 to 8,000 feet above the sea—the greater altitude (they supposed) the better. A more lamentable mistake could scarcely have been made. In avoiding Scylla they ran into Charybdis. The result of breathing this rarefied air, to persons unaccustomed to it, produced very distressing effects. In many it gives rise to hæmorrhage from the lungs It throws suddenly increased labor upon the lungs and heart. Distressing effects are manifested in divers ways, and these extreme altitudes, after a fair trial, had to be abandoned for situations less elevated. Late investigation seems to indicate that the comparative infrequency of phthisis among inhabitants residing in elevated regions is due, not so much to mere altitude, as to the absence of organic matter in the atmosphere of these high elevations.

"It is now established beyond all doubt that organic substances, whether gaseous products of putrefactive processes, or microscopic germs floating in the atmosphere, when they reach the bronchial tubes in the inspired air, are capable of exerting morbid processes which lead to serious results. It has been demonstrated that these organic substances are more numerous in the lower than in the higher strata of the atmosphere, and that they continue to diminish the higher we asend, until a certain height is reached in the mountain ascent, when they entirely disappear" [Loomis]. These deleterious organic substances, which are continually inhaled in the lower strata of the atmosphere, are one of the strongest arguments against sending patients to Florida, the West Indies, New Orleans, and cities on our Atlantic and Gulf coasts. In these situations, the altitude being small (the mean of Florida being but 57 feet above the sea, and that of New Orleans even less), the effect upon the organism must be most pernicious. The favorable effects of the inhalation of ozone, to consumptives, is well known, and the absence of this form of active oxygen in situations with but

slight elevation above the sea should discourage physicians from sending their patients to such resorts. There is much more ozone in the higher than in the lower strata of the atmosphere. That ozone is exceedingly valuable in the climatic treatment of phthisis is clearly indicated. The manner in which it operates on the organism is best explained by Dr. Schreider in his work on Climatology. Ozone possesses high oxidizing power and purifies the atmosphere by chemically uniting with the products of decomposition. It destroys organisms by combining with them. "It also promotes nutrition and blood changes by supplying to the respiratory organs a most active form of oxygen. Therefore, when choosing a health resort for phthisical invalids, we should give the preference to a locality in which there is constantly an excess of ozone in the air, for experience has established the fact that there the climate is especially salubrious." The air of the country contains more ozone than that of cities in the same latitude; and that the sea and mountains are richer in this variety of oxygen than the atmosphere of the plains. It is now generally conceded that a humid atmosphere is, as a rule to which there are but few exceptions, hurtful to consumptives. Dampness, however, is of different kinds. The atmosphere may derive on excess of moisture either from contact with the ocean, from excessive rainfall, or from the evaporation which takes place from the surface of impervious soils and in low situations. The latter kind is by far the most dangerous. Indeed, I am free to say that, in my opinion, this peculiar dampness arising from badly drained soil as a developing cause of consumption is second in importance to no condition, whether atmospheric or terrestrial. We are indebted chiefly to the labors of Bowditch of America and Buchanan of England for the elucidation of this important fact. They have fairly shown that dampness arising from low, badly drained, or clay soil is a very influential factor in the production of consumption.

Laennec has stated somewhere in his writings that he knew of a certain locality where this dampness was so constant that two thirds of the inhabitants died of phthisis. The application is plain—those localities only should be recommended where the soil is sandy or highly pervious to water, and where rainfall is rapidly absorbed, from the porosity of the soil, or else carried off

by streams. The important subject of temperature has been adverted to. The primary effect of a cold climate is an increased demand for oxygen; tissue changes take place more rapidly, together with the products of increased tissue metamorphosis. To meet this increased demand on the economy, more food is taken, the digestive power and appetite are increased, and all the processes which govern organic nutrition are improved. The process of absorption, secretion, sanguification, assimilation, respiration, and circulation are carried on much more actively than in warm climates. Cold, whether it be water or climate, is well known to be a powerful tonic. That increased oxidation of the tissues takes place in a cold climate is shown by the increased carbonic acid which is thrown off from the lungs. The most robust health is maintained where constructive and destructive metamorphosis of tissue is most actively carried on, and it is the fair balance of this process of destruction and reparation which constitutes the phenomena of life. "Under exposure to cold, oxygen being abundantly absorbed, the effete products of the blood are first consumed, so purifying that important fluid, and rendering it more fitted to nourish the body; next, by its consuming action on the tissues, oxygen promotes the cycle of changes just described, food is taken and assimilated, and thus destruction and construction of the tissues rapidly go on, so creating great physical vigor. Thus it is that cold climates are invigorating" [Ringer]. The effects of heat on the system are very much the opposite of those of cold. Heat is relaxing and enervating. Oxidation of the tissues is greatly lessened when the body is in an atmosphere warmer than itself.

The harmful effects of a warm, moist climate on the action of the skin has been referred to.

It is my belief that a serious misapprehension obtains among authorities with regard to the supposed injury which results to phthisical patients from variations of the atmosphere. It is a popular belief that, the nearer we approach to absolute uniformity of temperature, the nearer we approach to the ideal climate. To my mind a more fallacious idea never gained popular credence; a more pernicious one the professional man has rarely been called upon to correct. If this can be substantiated, cold climates should by all means be avoided: and the physician

who has heretofore advised patients to seek a cold, bracing, tonic atmosphere, where changes in the atmosphere the world over holds to a maximum, has either displayed ignorance of just what constitutes an atmosphere favorable to the successful treatment of consumption, or else has been trifling with human life. But I apprehend that our friends are in error. If from fear of unfavorable effects from this variation in temperature we advised patients against seeking cold latitudes, we should be guilty of a grevious wrong, for such advice would probably influence them against visiting locations where, as we have seen, such patients are most benefited. If variation in the temperature of the atmosphere is so terrible in its effects as many would have us believe, the question at once arises, why is pulmonary consumption not more common in cold latitudes where, as it has been shown, variability is the rule, and uniformity the exception? Again, if a mild, uniform, equable temperature is inimical to the development of phthisis, why is the disease so frequent in Florida, the West Indies, and other localities where the climate is remarkably uniform and where sudden changes in the atmosphere hold to a minimum?

After investigating the subject thoroughly one cannot avoid the conclusion that this matter has been greatly exaggerated, and that undue importance has been given to a particular feature of climate which there are no data to show is as harmful as is generally supposed.

After a careful study of the foregoing facts, and by way of summing up, we believe that we are justified is drawing the following deductions:

1. No zone enjoys entire immunity from pulmonary consumption.

2. The popular belief that phthisis is common in cold climates is fallacious.

3. The idea, now so prevalent, that phthisis is rare in warm climates is as untrue as it is dangerous.

4. The disease causes a larger proportion of deaths on the seashore—the mortality diminishing with elevation up to a certain point.

5. Altitude is inimical to the development of consumption, owing, chiefly, to the greater purity of the atmosphere in ele-

vated situations, its freedom from organic matter, and its richness in ozone.

6. Moisture arising from a clay soil or due to evaporation is one of the most influential factors in its production.

7. Dampness of the atmosphcae, from whatever cause and in any altitude, predisposes to the development of the disease, and is hurtful to those already attacked.

8. Dryness is a quality of the atmosphere of decided value.

9. The most unfavorable climate possible for consumptives is one of uniform high temperature and a high dew point (warm and moist).

10. That the effects due to change in the atmosphere are by no means so pernicious as are generally supposed, and that upon this subject present views require modification.

While the foregoing propositions are, in my judgment, true as a rule, many of the statements are not without exception. For example, while as a rule altitude is favorable in the treatof phthisis, Dr. Loomis says that his patients have almost uniformly grown worse by a stay at the Catskill Mountains, N. Y.; and Walsh is authority for the statement that Madrid in Spain, which is situated 2,000 feet above the sea, shows a high rate of mortality from the same cause. Again, while a cold, bracing climate is generally favorable to persons of the tuberculous cachexy, and to those having the disease in its first stages, yet it is well known that there are persons, met with occasionally, who are extremely sensitive to cold, and greatly depressed by it. And so there are those who find a warm, moist climate best adapted to their needs; but this must be very exceptional, and rather a curiosity of clinical experience. After thus having endeavored to give a brief *resume* of those features of climate which are at the present time regarded by our best authorities as favorable and unfavorable in the treatment of phthisis, the subject of the influence exerted upon consumptives by the climate of Minnesota in particular will next be referred to. A few words, first, with regard to the geography of Minnesota—its altitude, geology, the character and configuration of its soil, and other physical aspects. The surface of Minnesota is generally undulating. It consists chiefly of rolling plains or prairie, which have an elevation varying from 1,200 to 1,900 feet above the sea.

Little need be said with regard to the soil of the State. Professor N. H. Winchell, of the University of Minnesota, who has given the subject careful and intelligent study, says, by way of summary: "Hence, we may denominate the soils of Minnesota, except in the small area in the southwestern part of the State, the limits of which have not yet been accurately ascertained, as *drift soils*. The terms 'limestone soil' and 'sandstone soil' are almost inapplicable to our State...." A large portion of the State has a soil which is a light, sandy loam. The highlands of Minnesota constitute the water-shed of this continent. There are three rivers in the State whose sources are but a few miles apart, the waters of which, pursuing different directions, empty, one into the Arctic Ocean, one into the Atlantic, while a third mingles its waters with those of the Gulf of Mexico. In the "Medical Statistics of the Provost-General's Bureau, 1875," published under authority of the War Department, the mean altitude of twenty-two of our Northern and Western States are given as follows:

	Feet.		Feet.		Feet.
Minnesota,	1,100	Delaware,	100	Rhode Island,	125
West Virginia,	1,050	New York,	800	Ohio,	700
Iowa,	900	Missouri,	800	Pennsylvania,	700
Wisconsin,	850	Michigan,	800	Indiana,	675
Vermont,	600	Illinois,	625	New Hampshire,	625
Maine,	375	Kentucky,	600	Massachusetts,	400
New Jersey,	200	Maryland,	375	Connecticut,	300

District of Columbia, 125.

From this table it will be seen that, of all the States east of the Rocky Mountains, Minnesota has the greatest altitude. As might be expected, this varies in different portions of the State. The highest elevation is about 2,000 feet above the sea. Lake Itaska, which is the source of the Mississippi river, has an altitude of 1,530 feet. The following meteorological report for 1868 is published by the War Department. It will give the information which is most desirable in a study of the climate of Minnesota, For fuller and more comprehensive tables bearing upon the same subject, the reader is referred to the "Report of the Chief Signal Officer." It is but right and proper to say that the winter of 1878 was an unusually mild one for this State, and persons making estimates of the climate should remember that a mean average through a series of years would indicate several degrees lower temperature than is shown in these tables:

METEOROLOGICAL SUMMARY.

United States Signal Service Observations for 1878—St. Paul Station. (By permission of War Department.)

DATE	BAROMETER. Mean of— Local observations.	Telegraphic observations. Corrected for temperature, instrumental error and elevation. A. M.	P. M.	Midn't.	Corrected for temperature and instrumental error only. A. M.	P. M.	Midn't.	Range. Highest.	Lowest.	Difference.
1878.										
Jan...	30·003	30·015	29·990	30.007	29·133	29·122	29·132	30·563	29·533	1·030
Feb...	29·905	29·924	29·880	29.910	29·063	29.039	29·057	30·482	29·348	1·134
Mar..	29·838	29·870	29·793	29·846	29·030	28·982	29·018	30·262	29·328	0·934
April	29·651	29·684	29·609	29.655	28 866	28·818	28·849	30.032	28·737	1·295
May	29·823	29·853	29·778	29·832	29·038	28·984	29·022	30·190	29·401	0·789
June .	29·818	29·882	29·777	29·820	29·050	29·002	29·029	30·141	29·374	0·767
July..	27·875	29·905	29·842	29·887	29·115	29·074	27·084	30·140	29·571	0·569
Aug..	29·811	29·845	29·782	29·810	29·053	29·019	29 027	30·133	29·563	0·570
Sept..	29·895	29·937	29·865	29·907	29·121	29·078	29·102	30·430	29·260	1·170
Oct...	29·854	29·863	29·819	29·867	29·030	29·007	29·039	30·512	29·189	1·323
Nov..	2 ·977	29·996	29·937	29·960	29·139	29·110	29·144	20·395	29·467	0·828
Dec..	30·052	30·069	30·045	30·077	29·177	29·171	29·191	30·496	29·565	1·131
Sums.	358·513	358·840	358·117	358·608	348·815	348·406	348·694	363·776	352·236	11·540
Ann'l mean.	29·876	29·903	29·843	27·884	29·068	29·034	29·058	30·315	29·353	0·962

United States Signal Service Observations for 1878—St. Paul Station. (By permission of War Department.)—Continued.

DATE	THERMOMETER. Mean of— Local observations.	Telegraphic observations. A. M.	P. M.	Midn't	Range. Maximum.	Minimum.	Difference.	Mean relative humidity. (Local observations.) (Per cent.)
1878.								
January,	22·5	19·0	25·7	22·7	37	—13	50	79·7
February,	31·6	27·0	36·9	31·1	55	3	52	72·0
March,	44·4	37·5	51·9	43·4	64	21	43	66·6
April,	51·1	44·4	58·6	49·8	76	30	46	58·2
May,	55·1	49·2	62·0	52·5	79	33	46	56·7
June,	66·6	60·7	74·3	64·8	87	48	39	69·0
July,	73·7	68·5	80·5	72·2	96	57	39	72·9
August,	72·0	65·2	80·4	70·1	94	52	42	68·3
September,	60·6	53·6	69·0	59·0	94	36	58	67·4
October,	46·3	40·8	51·9	44·2	72	15	57	62·3
November,	38·3	32·3	45·4	36·7	64	15	49	66·2
December,	19·3	15·7	23·6	18·2	44	—13	57	74·3
Sums,	581·5	513·9	660·2	565·7	86·2	28·4	57·8	812·6
Annual means,	48·5	42·8	55·0	47·1	71·8	23·7	48·1	67·7

United States Signal Service Observations for 1878—St. Paul Station. (By permission of War Department.)—CONTINUED.

DATE.	WIND.							Am't of rain or melted snow. (Inches and hundredths.)	Number of days on which rain or snow fell.	Number of auroras
	Prevailing direction.	NUMBER OF MILES.					Maximum velocity during month.			
		Noon to 6 P. M.	6 P. M. to midnight.	Midnight to 6 A. M.	6 A. M to noon.	Total.				
1878.										
January,	SE.	1531	1199	1112	1460	5293	32	1·00	8	1
February,	N.	1501	1119	889	1176	4685	26	0·67	6	0
March,	SE.	2278	1405	1482	2024	7189	40	1·24	11	0
April,	E.	2389	1784	1406	1944	7523	43	2·43	15	0
May,	NW.	2252	1584	1445	2070	7351	40	2·33	13	0
June,	SE.	1982	1367	1155	1732	6236	30	3·58	14	0
July,	SE.	1779	1114	928	1591	5412	36	4·47	12	0
August,	NW.	1651	981	1012	1343	4987	36	1·43	7	0
September,	SE.	2019	1256	1287	1688	6250	55	2·13	12	0
October,	NW.	2508	1799	1696	2109	8112	47	1·85	14	0
November,	SE.	1693	1313	1173	1466	5645	26	0·61	4	0
December,	NW.	1600	1356	1334	1496	5786	22	1·04	13	0
Sums,		23183	16268	14919	20099	74469		22·78	129	1

From a study of these meteorological reports it will be observed that the mean temperature of St. Paul for 1878 was 48°5. It will also become apparent that the impression, which is held by so many persons who reside out of the State, that the climate though cold is uniformly cold, is a mistake. The difference between the maximum and minimum range of temperature is great. There is no country of which I have any knowledge, situated in the same latitude as Minnesota, and whose mean altitude is upward of 1,100 feet, which is not subject to atmospheric variations just as great as those observed in this State. Therefore, when it is proposed to try the effects upon a phthisical patient of a cold, bracing climate as a therapeutic measure, the fact must be kept constantly in view that such a climate, in whatever zone, is subject to sudden atmospheric changes. So true is this, that coldness and climatic variability are wellnigh synonymous terms. Elsewhere I have endeavored to refute the impression which so largely obtains that changes in the atmosphere are hurtful and dangerous. My own observation has led me to the conclusion that individuals wintering in Minnesota, if warmly clad in woolens, experience none of the pernicious effects from sudden changes in the atmosphere which not a few

describe, but none here have observed. A careful inquiry among physicians residing in different portions of the State, has elicited nothing but what is confirmatory of such a statement. Sudden variations in the atmosphere, exposure, etc., are supposed in the great majority of cases to stand in a causative relation to pneumonia. Accepting this as partly true, it would seem that this disease would be an exceedingly common one in Minnesota, where atmospheric changes are not only great but sudden. Investigations (*vide* "Vital Statistics," U. S., 1860) indicate that the mortality from pneumonia is twice as great in the New England and the Middle States, and much greater also in the Southern States than it is in Minnesota. Copying from the "Vital Statistics" of Minnesota, the deaths from consumption by months were as follows through four years:

MONTHS.	1874.	1873.	1872.	1871.	Total for four years.
December,	54	30	36	25	145
January,	52	45	41	32	170
February,	45	32	34	29	140
June,	47	41	35	30	152
July,	67	47	30	35	169
August,	52	54	46	39	191

Total deaths from consumption during the winter months for four years, 455.

Total deaths from consumption during the summer months for four years, 512.

From a study of the foregoing tables, it will be observed that in the three months of the year which are coldest and subject to the greatest atmospheric variations, there were fewer deaths from the disease than in the three corresponding summer months, during which equability and uniformity of the atmosphere were the rule, and variability the exception. That sudden atmospheric changes in this State are not so hurtful to phthisical patients as is generally supposed is clearly indicated, and the indication is sustained by ample corroborative testimony. Why these weather changes do not result in more mischief to invalids is practically not an important question: it is sufficient to know that such is a fact, confirmed alike by the mortuary reports and in the experience of physicians in different portions of the State.

Whenever the claims of Minnesota as a desirable resort for consumptives is urged, we are almost invariably met with the

same reply, viz: that the rigors of the winter are entirely too severe on patients; and, atmospheric variations being great and sudden, the effects must be hurtful,

I have elsewhere attempted to show that neither of these objections can be substantiated, either by an appeal to the mortuary reports of this State, or to the experience and observation of the physicians practicing here. That the thermometer frequently goes below zero in Minnesota, just as it does in New England, New York, and other States, is well known, but there are few if any now who, in the light of the late investigation, will contend that mere cold, however severe, either predisposes to phthisis or is hurtful to those already attacked. Those who candidly accept facts must admit that this climate is subject to considerable atmospheric variation. Now, if the effects of this are so pernicious to invalids as many picture them, why are the results not apparent in the mortuary reports of the State? The injurious effects upon the economy of a moist atmosphere have been alluded to. By referring to the foregoing meteorological tables it will be observed that the atmosphere of this State is remarkably free from moisture. The geographical location of Minnesota protects her from all oceanic influences. It need scarcely be repeated that this marine atmosphere is a fruitful scource of mischief to consumptives, as indicated by the large death-rate to those persons residing in situations where this influence is operative. The well-known high rate of mortality from consumption among the inhabitants of New England, New York, New Jersey, and other States bordering on the Atlantic Ocean is due largely to this cause. It is not surprising that Florida should suffer from this scourge when we remember that it is a peninsula, and therefore exposed on two sides to this oceanic influence. Hygrometric measurements show that the atmosphere of that State is loaded with moisture.

Consumption may almost be termed an "indoor" disease, and lack of exercise in the open air as a development cause is scarcely less important than heredity itself. This will explain the alarming prevalence of the disease among those who lead inactive and sedentary lives. Editors, clergymen, the occupants of boarding schools, hospitals, and nunneries, become etiolated, and they fall an easy prey to consumption. It is at present con-

ceded upon all hands that the cure of the disease depends more upon what may be termed the open-air treatment than any other, be it dietetic or therapeutic. Not a small proportion of the medical profession in this country, aware of the great importance of keeping patients in the open air as much as possible, have advised against a trip to Minnesota, through fear that patients could not be in the open air sufficiently, on account of the cold weather experienced here during the winter. This objection is well taken, and is fatal to Minnesota, or indeed any resort either home or foreign, if it can be substantiated. It is my sincere belief that invalids can be as much in the open air in this State during the 365 days of the year as they can in any State in the Union. With warm wrappings they can be in the open air almost all the time, during our winter as well as our summer months. The whole number of days during our winters the extreme cold of which prevents invalids being out of doors are fewer in number than are the rainy days during a corresponding period of time in Florida, whith of course prevents invalids from being out. Let an unprejudiced person carefully study the meteorological reports as published by the War Department, with reference to the bearing upon this subject, and he will, I am satisfied, be convinced that more actual time can be spent in the open air in the State of Minnesota than in Florida. There are many ways in which an invalid may pleasantly pass the time in the open air here during the winter months. Dr. Foissac, in his work on meteorology, quotes the remark of Admiral Wrangele, that "Diseases are of rare occurance in Siberia, and old persons preserve their vigor until a very advanced period. The exercise they take in the open air, whether traveling on sledges or skating on the ice, is the chief cause of their good health."

To ascertain the opinion of the profession of this State concerning the effects of climate upon phthisis, the Minnesota State Board of Health recently sent out a circular and received the following replies:

Q. I. Is tubercular consumption as liable to be developed here as in the eastern or southern portions of our country, in persons predisposed to the disease?

Forty-one answers were received. Yes, 1; no, 37; undecided, 3.

Q. II. Have you known any cases to originate in this State in persons not supposed to be predisposed to the disease?

Forty-one answers were received. Yes, 17; no, 21; undecided, 3.

Q. III. Does the climate of Minnesota favor the cure of phthisis pulmonalis (any form) originating elsewhere?

Forty-one answers. Yes, 39; no, 2. More than one-half supplemented the answer with "in the early stages of the disease."

Q. IV. If so, to what characteristics of the climate is the favorable effect due, and in what manner is it produced?

Thirty-nine answers. "To dry and stimulating character of the atmosphere." "Tonic effects upon the whole system." "To elevation and a clear and dry atmosphere" "To dry atmosphere and ozone." "Stimulating effects of atmosphere in connection with outdoor exercise." "To light and its effects mostly." "Cold winters more favorable than mild."

Q. V. In what stage of the disease are consumptives most likely to be benefited by residence here?

Forty answers. In the incipient stage, 32. In all stages, but better in early stage, 4.

Q. VI. Is a tendency to hæmorrhage in any stage of the disease an indication favorable or unfavorable to immigration to this State?

Forty answers. Favorable, 18, unfavorable, 6; undecided, 12.

Q. VII. What month are most favorable to immigration here?

Forty answers. Autumn, 8; Summer, 12; Spring, 5; late Spring or early fall, 10; any month, 2; undecided, 3.

Q. VIII. Do you know of persons now living in the State or elsewhere who came here while suffering from phthisis, either incipient or developed, and who were cured or benefited by residence here?

Forty-one answers. Yes, 24; many, 7; a few, 3; no, 1; cannot say, 6.

The favorable view I entertain with regard to the climate of Minnesota, being the opinion of but a single individual, would be entitled to but little weight, if the deductions drawn cannot be established by an appeal to facts and corroborated in

the experience and observation of the medical practitioners located in different portions of the State. Elsewhere attention has been directed to the meteorological and mortuary reports of the State and the bearing they have upon this subject. With regard to the replies to the circular sent out by the State Board of Health, I think they possess great value. They clearly indicate the estimation which is placed upon the climate of this State by forty of the oldest and most prominent practitioners in it, who have through a series of years had ample opportunity to watch and study climatic effects upon phthisis as it has occurred in their own practice. Dr. D. W. Hand, President of the State Board of Health, writes as follows upon this subject:

"Persons with an hereditary tendency to consumption, or with the disease already beginning, will find this climate remarkably well adapted to their wants."

"Between the pleasant rolling prairie, the wooded lake region, and the dense pine forests of the northern section of the State, they can choose what seems most agreeable and best adapted to them, while the dry, bracing atmosphere will enable them to live much of the time out of doors without fear of 'taking cold.' This comparative exemption from taking 'colds' when exposed to the open air, day or night, is, in my opinion, one of the greatest charms of this climate."

The late distinguished Congregational divine, Rev. Horace Bushnell, D. D., of Connecticut, who spent a summer in this State for the benefit of his health, wrote concerning this climate as follows: "The winter climate is cold, and yet so dry and clear and still, for the most part, as to create no great suffering. One who is properly dressed finds the climate much more agreeable than the amphibious, half-fluid, half-sloppy, grave-like chill of the East. Real snow-storms are rare; there were none last winter. A little more snow to make better sleighing would be an improvement. As to rain in winter, it is almost unknown. There was not a drop of it last winter, from the latter part of October to the middle of March, except a slight drizzle on Thanksgiving Day. I had spent a year in Cuba without benefit. I had spent also nearly a year in California, making a gain in dry season, and a partial loss in the wet season, returning, however, sufficiently improved to resume my labors. Breaking down

again from this only partial recovery, I made the experiment now of Minnesota; and, submitting myself, on returning, to a very rigid examination by a physician who did not know at all what verdict had been passed by other physicians before, he said, in accordance with their opinions, 'you have had difficulty in your right lung, but it is now healed."

Testimony of a similar nature could be produced from persons residing in different portions of the Union, but this would be inconsistent with the original scope of this paper.

In estimating the advantages likely to result to an invalid by a change of climate, there are many things to be taken into consideration besides the mere effects on the system of altitude, humidity, latitude, temperature, atmospheric pressure, etc. Before selecting a situation, we should have clearly in our mind the advantages a location offers for recreation, for exercise, for spending the greater portion of the time in the open air, for sport, for social enjoyment, etc. Invalids will find St. Paul, the capital of the State, a beautiful and attractive city of about 50,000 inhabitants. It is situated upon the Mississippi River at the head of navigation. It is the great commercial centre of the Northwest. The city offers to the visitor superior advantages for recreation, pleasant diversion, social enjoyments, etc. There are several daily newspapers published here which would be a credit to any city, however populous. There is an able pulpit, a public library, excellent hotels, private boarding-houses, theatres, etc. The environs of the city are delightful. The picturesque scenery about St. Paul has become familiar to many persons in different portions of the Union by means of the stereoscopic views carried home by the annual stream of visitors who come to the city. During the summer months there are daily excursions to the numerous pleasure resorts, lakes, etc., in the vicinity of the city.

The beauty and fame of these lakes, especially, have gone abroad and bring to our State annually an increased number of health and pleasure seekers. Lakes White Bear, Minnetonka, Elmo, and others in the immediate vicinity of the city, are perhaps surpassed in beauty only by Lake George in New York. They afford fine opportunities to the invalid for profitable diversion and recreation. Fine fishing, gunning, rowing, sailing,

bathing, and driving, together with the pleasures which the lakes offer for social intercourse, combine to render these resorts extremely pleasant and cheerful. Many short excursions may be made from the city to places of interest in its vicinity. The renowned Falls of Minnehaha, Fort Snelling, and the Falls of St. Anthony, may be especially mentioned as pleasant places to visit. It may be thought singular that, in a paper on climatology, I should allow myself to be so much diverted as to enter into a description of St. Paul and its near by attractions. I have no apology to offer for this. It is too much the habit of medical advisors to send patients to resorts known only by their meteorological reputations.

To my mind it is a matter of no mean importance to know what are to be the invalid's surroundings at a health or pleasure resort. That physician will be most successful in the treatment of phthisis, or indeed any disease, who does not despise small things.

Among the numerous circumstances requiring investigation are the probable effects each particular climate is likely to exert on the digestive and assimilative powers of the patient. This I consider a highly important matter. It is but charitable to assume that there are none who, in the light of late investigation, are not willing to acknowledge that the appetite is keener, digestion more actively and painlessly performed, and that the assimilation of food is carried on more perfectly in a cold than in a warm climate. In cold climates there is an increased demand for food, and an increased ability to digest it. The powers of assimilation being strengthened, there results, as a natural consequence, an evolution of muscular, nervous, and glandular force.

It is almost universally remarked that, shortly after their arrival in Minnesota, invalids notice a marked improvement in their appetite and digestion. So true is this that there are medical writers who maintain that this improvement of digestion and assimilation is a more influential factor in the successful treatment and cure of consumption, as it presents itself in this State, than all the other favorable conditions combined. It is not alone the nitrogenous foods which are so well digested, but the hydro-carbons as well. It is the latter variety which play such an important *role* in the constructive metamorphosis of tissue.

"The deficient digestion of animal food in phthisis is a very serious thing. It keeps the patient in such a weak state that fatal effects follow shocks that could otherwise be borne up against." "In tuberculous consumption the body wastes away, not because of the destruction of fat being increased, but because of its renewal being arrested."

"The great object in the treatment of phthisis is to get the system in such a condition that it will assimilate fat." "To find the easiest assimilated oil and to prepare the digestion for the absorption of oil are the main problems in the cure of consumption." (Chambers on the Indigestions.) The above quotations from recognized high authority indicate clearly enough both the importance of improving the digestive viscera of the patients and of their taking animal food and oil after the improvement has been effected. There is, perhaps, no State in the Union in which the processes of digestion and assimilation are more actively performed than in Minnesota. This was commented upon in the replies received in answer to the circular sent out by the State Board of Health. To my mind, one of the most serious objections against warm climates, as a resort for consumptives, is the intense dislike which patients acquire for foods which are rich in hydro-carbons, but especially oils. So high an authority as Baron Liebig states that oily foods are disgustful to persons in hot climates. When, therefore, Dr. Chambers has shown how immensely important it is that consumptives should take oil and assimilate it, taken in connection with the declaration of Liebig that such food is disgustful to persons in warm climates, the question at once arises: Is a medical adviser ever justified in sending invalids to warm resorts, where this pernicious influence will be most operative?

It is difficult to understand the reason why the profession in this country still persist in sending their patients to Florida. That improvement should take place in that State is against reason and experience alike. If we except a sandy soil, it does not possess a single element which is now regarded as favorable for the palliation or cure of phthisis. The climate is miserable; it is hot and damp. The altitude being low, the atmosphere has much organic matter in it. The streams are sluggish; the atmosphere in many localities filled with malaria. The State is

exposed on two sides to oceanic influences. When crude tubercle has formed in the lungs, the great desideratum is to keep it from breaking down. It is well known that the lungs are oftentimes exceedingly tolerant of hardened tubercle. It may give rise to but little local or constitutional disturbance for years. But, when this mass begins to break down and undergo a process of softening and discharge, from whatever cause, the end is not far off. The great object in the treatment of consumption is not to remove the tuberculous mass already formed in the lungs, but rather to place the patient in such a condition that its further formation will be arrested, and that already existing there may be kept from breaking down and undergoing the process of discharge and suppuration. The climate of Florida, which is moist and warm, must certainly have the effect of breaking down this tuberculous matter. Heat and moisture in the form of poultices act in the same manner upon external tissues This warm, moist climate of Florida must act as an internal poultice, softening the morbid mass, and thereby hastening the fatal end.

It should be a matter of congratulation that the medical profession of this country are beginning to study this question of climatology in an enlightened and rational way of late, and we may confidently look forward to the time when the effects of climate upon consumptives will be a thoroughly worked-out problem. A comparison of the mortality with the startling results observed upon the inhabitants of warm and cold latitudes has at last challenged the attention of the more thoughtful of our profession, and they are now seriously asking themselves whether, in the light of recent investigation, they are ever justified in sending patients with consumption to those very sections which have always shown a maximum death-rate from the disease. Professor Loomis, in his admirable address before the American Medical Association, 1878, says: "For a long time a warm, sedative climate was regarded as the suitable one for phthisical invalids; more recently it has been claimed that a cold climate is the favorable one, and that phthisical mortality decreases as we go northward."

In an able article ("American Journal of the Medical Sciences," January, 1872), Dr. Simons, of Charlestown, S. C., a place by the way of no mean reputation as a Southern sanitarium for phthisical patients, admits with a frankness which does him

honor, the superiority of a cold over a warm climate. He says: "We are justified, therefore, in making the general statement that cold, bracing climates are the most applicable to those cases which merely present predisposition to, or are in the early stages of consumption." Dr. Doble, "On the First Stage of Consumption" (London, 1867), holds substantially the same view. After entering at length into the subject, he arrives at the following conclusion: "Exercise should therefore be taken, which, as well known, stimulates the functions, increases the appetite, and promotes the circulation of the blood. The patient should be sent in the early stages to a dry and cold climate, and bathing in or sponging with cold water should be recommended." Dr. T. K. Chambers informs us that they send their phthisical patients of England to the cold, bracing air of northern Scotland. It is during the first stage of consumption (the curative stage) that invalids derive so much benefit from a visit to Minnesota. Nowhere in this paper have I desired to create the impression that, during the advanced stages of this malady, the climate of this State would be beneficial. I cannot insist too strongly upon the inutility of sending phthisical patients to this State who are in the advanced stages of the disease. It is my belief, that where the stage of ulceration and excavation has been reached—and this can only be determined by means of physical diagnosis—this climate does positive harm. There are, however, numerous exceptions to this rule.

As a rule, it is only those predisposed to the disease, or laboring under its first stages, who are likely to be benefited or cured by the climate of Minnesota.

If physicians are determined to send their patients to a warm instead of a cold, bracing, invigorating climate, it seems to me they should by all means select a site with considerable elevation above the sea, and where the atmosphere is dry. Such a place, for example, as Aiken, S. C., which has an elevation of 556 feet above the sea, and the climate of which is dry—differing in this respect from the climate of Florida. There is no necessity for sending phthisical patients to European resorts.

We have in this country every diversity of climate, and there is no particular climate in Europe which has not a counterpart in this country. The monthly variations in temperature at Madeira and the Canaries are very much the same as those of

Pilatka and St. Augustine in Florida. The climate of Malaga and Algiers corresponds closely with that of Santa Barbara and San Diego in California; while Mentone, which at present is prehaps the most vaunted and best advertised sanitarium in Europe, has a climate which closely resembles that of Aiken, S. C., the difference being only 4° Fahr. in a monthly mean. Denver and St. Paul have their counterpart in the mountainous resorts of Switzerland. The objection to the climate of Colorado is that the altitude of that State is too great; and that there is a fine sand in the atmosphere, caught up and transported by the stiff breezes experienced on the high table-lands of this State, and that these foreign substances, coming in contact with the delicate mucous membrane of the bronchial tubes, cause great irritation to the lungs, which are already sore and weakened from diseased processes.

The late distinguished Professor Lewis Rogers, of Louisville, Ky., who, during the winter of 1873, visited California with a view of determining from personal observation the influence of the climate of that State upon consumptives, says (American Practitioner," May, 1874): "To my surprise, I did not find a single resident physician at all enthusiastic in his praises of Southern California. I asked them if they were in the habit of sending their patients there, and they replied, that they did so occasionally, and for a brief period, in the winter, but they preferred for most of their cases the high and cool resorts of the Sierra Nevada Mountains." Further along, in speaking of San Diego and Santa Barbara, two of the most popular resorts in that State for invalids, he says: "The proximity to the sea renders the air salt and somewhat humid, unless the air blows from inland, and in the winter season cold fogs are somewhat troublesome for a portion of the day. From what I could learn, they are deficient in variety and abundance of the best kinds of food. The general supply of some of the most essential articles is brought from a distance." Professor Loomis is of the opinion that camping in pine forests is one of our most valuable means in combating consumption. The turpentine exhaled from pine trees, as is well known, converts ordinary oxygen into ozone, and it has been shown that this is definitely valuable as a remedy in phthisis. The immense pine forests of Minnesota will afford the invalid ample opportunity to test the value of Professor

Loomis's suggestion. I must confess to being somewhat skeptical with regard to the improvement which follows the camping-out in the pineries; still, it may be tried.

In closing this paper I cannot do better than give the conclusions at which Dr. Franklin Staples, of this State, arrived in his "Report on the Influence of Climate on Pulmonary Diseases in Minnesota," read before the American Medical Association in 1876. He says: "Among the conclusions to which we think our investigation has led are the following: 1. Owing to the geographical position of Minnesota, the altitude and general physical condition of the surface of the country, the character of the soil, the temperature and comparative dryness of the atmosphere, the character of the sun's light here, the freedom from all forms of paludal poisons, and to other causes, the climate of the State is stimulating and favorable in its effects upon diseases of the lungs and air-passages, which are dependent upon and characterized by debility, imperfect digestion and assimilation, and the tuberculous and strumous diathesis. 2. That the beneficial effects of the climate are due largely to influences exerted directly or indirectly upon the functions of nutrition. 3. That acute lobar pneumonia is not to any great extent prevalent here, but that the chronic forms of pneumonia inflammation are found to exist, and that the cases of phthisis pulmonalis originating here have been generally of pneumonic origin; but that this does not conflict with the fact that phthisis contracted elsewhere and under different climatic conditions may be benefited and cured by influences found to exist here; and that we find facts to verify this conclusion, especially in the large number of the present inhabitants of the State now in good health, who came from other localities as invalids suffering from evident phthisis pulmonalis, either caseous or tuberculous. 4. That, since the climate of the northwest, in common with that of all other regions and countries, has its imperfactions, its disadvantages in some classes of invalids suffering from pulmonary disease, as well as its great advantages to others, an intelligent discrimination should be exercised on the part of the medical profession of the country concerning the patients to be sent to Minnesota for relief; and it should be known that, for the consumptive, merely temporary residence here is not likely to result in permanent benefit."